

Bank diversification strategy and intellectual capital in Ghana: an empirical analysis

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Abstract

Purpose – The purpose of this paper is to examine the impact of intellectual capital and its components on bank diversification choice.

Design/methodology/approach – Both asset and income diversification are computed and an unbalanced panel data set of 32 banks covering the period 2000–2015 have been used. The panel corrected standard error regression has been used to account for serial correlation and heteroscedasticity.

Findings – The study found that intellectual capital determines the choice of diversifying. Precisely, intellectual capital motivates asset diversity but it dissuades income diversification. Human capital and structural capital are major components that determine asset diversity decisions. Income diversification decision, in this case to choose a focus strategy, is determined by human capital. This gives credence for the human capital theory in Ghana. Competition encourages a focus strategy. Bank size and leverage enhances income diversification while stock exchange listing and government ownership fosters the focus strategy.

Practical implications – Diversification strategy, knowledge base of staff, corporate governance and internal control have been considered as factors leading to the collapse of some Ghanaian banks in 2017–2018. The study provides relevant insights for regulators, decision support units and corporate boards. Intellectual capital and value added metrics should be used for modelling and decision making as they have value relevance.

Originality/value – This is a premier study that has examined the nexus between diversification strategy and intellectual capital in banks.

Keywords Africa, Intellectual capital, Structural capital, Bank of Ghana, Diversification strategy, Stakeholder view

Paper type Research paper

Introduction

There have been fears expressed by some analysts that unless organisations adjust to technological changes, they may end up being obsolete and less competitive. Even the strategic management concept of competitive advantage (Porter, 1990, 2008) has been challenged with the notion of a transient advantage (McGrath, 2013). These concerns and quest for a paradigm shift are borne by the current fourth industrial revolution. The accounting standard-setters are yet to develop a new accounting standard to account for intangibles in place of the IAS 38: Intangible Assets, which was developed in the 1990s

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(Onumah and Duho, 2019). Experts have expressed worry on the disparity between a 1970s statement of financial position and the same statement for 2019, for example. While tangibles form 80 per cent of those old-time financial statements, current financial statements account for only 20 per cent of tangible assets with the rest being intangibles which are not accounted for by an accounting standard (Corrado and Hulten, 2010; Sullivan and Sullivan, 2000). This raises key concerns for reporting and decision making especially in the services industry.

The business of banking is basically a business of risk management. Strategies employed by banks may have implications for profitability, efficiency, stability and productivity (Alhassan, 2015; Duho *et al.*, 2019). As banks aim to meet the demands of customers within the current business ecosystem of demographics, geopolitical impact, globalisation, digital technology in the midst of competition, they tend to earn increasing revenue from non-interest income. In effect, non-traditional revenue sources are becoming more profitable. An example of traditional source of revenue for banks is interest from loans and advances as well as gains from investments known as fee income. Non-traditional sources include fees and commissions, automatic teller machine (ATM) service charges; and bancassurance commissions. These can be classed into two groups, namely, fees-for-service incomes like insurance and brokerage and stakeholder income that involves banks investing in assets like revenue from associates of banks and subsidiaries (DeYoung and Torna, 2013). Basically, there are two fundamental theories on diversification strategy. The conglomeration hypothesis opines that organisation-wide managerial efforts are enhanced by diversifying. The strategic-focus hypothesis opines that high earnings volatility, agency costs, high monitoring costs and difficulty in monitoring are associated with diversification. In line with these hypotheses, it is needful to examine how the intellectual capital efforts of banks drive their diversification strategy. It can be argued that banks with high intellectual capital will have experience and knowledgeable employees, strong IT infrastructure, good internal processes and procedures and will be able to venture into providing innovative products and services which will increase their revenue. On the other hand, it can also be argued that banks with high intellectual capital will tend to focus on the traditional banking business and provide it with high quality, agility and speed. These relationships explain the inconclusive and ambiguous nature of how diversification relates with various factors (Abuzayed *et al.*, 2018).

In the extant intellectual capital or diversification literature, this nexus has not been examined. The current study aims to fill the paucity in literature by examining the impact of intellectual capital and its components (human capital efficiency, structural capital efficiency and capital employed efficiency) on the asset diversity and income diversification of banks in Ghana. The research questions are as follows:

RQ1. What is the impact of intellectual capital and its components on asset diversity?

RQ2. What is the impact of intellectual capital and its components on income diversification?

The study employed the diversification indices proposed by Laeven and Levine (2007) to measure diversification. Furthermore, the value added intellectual capital coefficient model of Pulic (1998, 2000, 2001, 2004, 2008) has been employed to measure intellectual capital and its components. The model which is based on a multi-stakeholder perspective of wealth creation developed ratios from financial statements to account for employee expertise and experience (i.e. human capital), internal processes and procedures, technological infrastructure, policies and organisational culture (i.e. structural capital) and capital employed efficiency which account for value created for shareholders. The model has been employed in majority of regression-related studies on intellectual capital. The panel-corrected standard error regression of Beck and Katz (1995) has been used to examine the nexus while controlling for size, competition, leverage, stock exchange listing and government ownership.

The results of the study found that intellectual capital drives the choice of an asset diversification strategy in banks. This is driven by the human capital and structural capital base of the banks. Income diversification on the other hand is negatively influenced by intellectual capital, suggesting that intellectually-rich banks prefer a focus strategy to diversification in terms of their revenue model. The human capital base is the main factor motivating the choice for focussed strategy for the revenue model. Competition in the industry motivates the choice of a focussed strategy above the diversified strategy. In addition, bank size and leverage enhance the choice of a diversified strategy as opposed to a focussed strategy. Banks listed on the stock exchange prefer a focussed strategy to those that are unlisted. Also, government-owned banks prefer a focussed strategy to a diversified strategy for their revenue model. The study is of relevance for policy making, practice, future research and teaching.

The remainder of the paper is organised as follows. The next section provides a brief overview of the banking industry of Ghana. A critical review of relevant literature is provided in the third section. The fourth section provides a description of the methodology and data employed. The fifth section provides the results and discussions of the results. The next to last section draws conclusion on the study while the last section provides relevant implications of the study for policy, practice and academia.

Brief overview of the banking industry of Ghana

The banking industry of Ghana has over 100 years history from the establishment of the first Government Savings Bank which was a branch of British Bank of West Africa (now Standard Chartered Bank) in 1896 (Onumah and Duho, 2019). Prior to independence in 1957, the government set up a commercial bank which was meant to oversee commercial banking activities and a central bank to control monetary policy and other regulatory activities. The two banks were later separated in 1957 but in earlier years, starting from 1953, the bank operated as Bank of Gold Coast. Banks were classed according to the activities they performed. For instance, we had investment banking, agricultural development banking, merchant banking and social security banking (Mensah and Obeng, 2015). It was as though the banks were meant to operate in silos.

Economic instability in the 1970s resulted in the economic partners such as the World Bank and the International Monetary Fund stepping in to ensure financial stability and restore the economy to buoyancy (Isshaq and Bokpin, 2012). The programmes which are the Economic Recovery Programme, Financial Sector Adjustment Programmes and Financial Sector Strategy Plan saw the economy and financial sector revitalized, deregulated and restructured (Korsah *et al.*, 2001). In all these years, the banking industry has been very relevant in performing the role of financial intermediation in the economy and thus fostering growth and development. The capital requirements of the banks were not so high over these periods. One of the effects of low capital requirement is the inability of banks to engage in high value transactions.

In 2000, the banking industry evidenced the collapse of some banks after the banks became unstable. This was linked to real estate losses, and a notable bank as an example was Bank of Housing and Construction (Sheng and Tannor, 1996). The aftermath saw regulatory and supervisory actions to remedy the problems. For instance, the Universal Banking licence became operationalised in 2003 and the Banking Act (Act 673) was enacted a year after (i.e. 2004). This license adds to the menu of activities that banks can engage in (Onumah and Duho, 2019). In 2003, and the years that follow, competition became intensive as foreign banks entered into the Ghanaian banking industry. Most of these new banks were the subsidiaries of banks in Nigeria. The result of this is that as competition increased, innovation also increased and banks began to offer diverse forms of services. This also suggests that their income sources began to expand to cover not only the traditional income sources but also non-traditional income sources. Yet, during these times, the minimum capital requirements of banks were not

significantly increased. From history, the 1989 pegging was made at \$740,700, and was increased to GH¢7m in 2003. It was then increased to GH¢60m in 2008. In 2013, the regulator proposed for all new entrants to meet the requirement of GH¢120m while existing banks were advised to beef up their stated capital level.

In 2017–2018, the industry saw another high level instability of banks which saw the collapse of a total of seven banks which were either merged, or acquired. Concerns about these banks and their instability have been linked to poor corporate governance, poor risk management, high non-performing loans and poor management (Onumah and Duho, 2019, in press). Some analysts indicated that regulation and supervision was also a factor. The industry regulator, the Bank of Ghana, has been taking steps to apply the recommendations of the Basel Accords which are meant to ensure prudent regulation of the financial system in each country. An essential aspect of the Accord dwells on the need to regulate capital risk, market risk and operational risk. For banks, the regulatory capital serves as a shock absorber and serves as an indicator as to what level of financial transaction they can engage in. To foster growth, enhance risk management and foster stability in the banking industry, the regulator increased the minimum capital requirement from GH¢120m to GH¢400m. This saw the total number of licenced banks operating in the industry decrease from 34 to 23 by January 2019.

Although the industry has implemented some technological initiatives in its operations such as mobile money banking, digital banking and ATM, there are still more to do. This is because while discussions regarding robotics process automation, artificial intelligence, blockchain, cloud computing, big data analytics and their application in banking are topical issues at the global level, there has not been any transformational implementation in the industry yet. Thus, the problem of high non-performing loans which has bedevilled the industry over the years has not been dealt with. Some attributes of poor loan performance are information asymmetry, moral hazard and adverse selection. These technologies are tipped by analysts of being able to enhance the efficiency and performance of banks (Onumah and Duho, in press). Since these have not yet been achieved, banks tend to diversify so as to earn income from other sources apart from the mainstream interest income sources. Moreover, these emerging technologies themselves are essentially possible non-traditional revenue sources for Ghanaian banks. Thus, the effect of the knowledge-base or intellectual capital-base of the banks and how it affects the diversification strategy is an essential analysis which will provide insights to the various stakeholders of the industry.

Literature review

There is a gap in literature as to how intellectual capitals of banks impact their diversification strategy. The extant literature have a number of empirical studies that examined how intellectual capital affects profitability (Mondal and Ghosh, 2012; Onumah and Duho, 2019; Saengchan, 2008), efficiency (Onumah and Duho, in press; Yalama and Coskun, 2007), productivity (Alhassan and Asare, 2016) and financial stability (Ghosh and Maji, 2014; Onumah and Duho, 2019). Some studies also examined the determinants of intellectual capital (Duho and Onumah, 2018; El-Bannany, 2008). In the strand of studies that explored the impact of intellectual capital and its components on profitability measures, there have been mixed findings. In Thailand, Saengchan (2008) used banking data from 2000 to 2007 to examine how intellectual capital creates value. The study found a strong nexus between intellectual capital and return on asset. In terms of the components of value added intellectual coefficient, the study found that capital employed efficiency has the strongest effect on profitability. Mondal and Ghosh (2012) examined how intellectual capital affects a number of performance metrics of banks in India using a data set of 65 banks from 1999 to 2008. The study found that while intellectual capital is a source of competitive advantage, it has different impacts on profitability and productivity. As regards the components of intellectual capital, the study found human capital efficiency to be the main driver of performance. The prevalence of the human capital

theory has also been evidenced by Onumah and Duho (2019), which examined the nexus in the Ghanaian banking industry using a data set from 2000 to 2015. The study found that intellectual capital affects profitability of banks.

The studies that examine the effect of intellectual capital make use of financial ratios or other means of computing efficiency. For instance, while Saengchan (2008) used the cost to asset ratios to proxy efficiency, Onumah and Duho (in press) employed the data envelopment analysis to measure different efficiency scores, namely, technical efficiency, cost efficiency and profit efficiency. Saengchan (2008) found that intellectual capital improves efficiency with human capital as the main driver of cost efficiency. Onumah and Duho (in press) also found evidence to support this assertion using data from the Ghanaian context. Yalama and Coskun (2007) used data envelopment analysis to construct three portfolios using data from the Istanbul Stock Exchange covering the period 1995–2004. The result suggests that the portfolio with intellectual capital as an input has a higher score which suggests the relevance of intellectual capital in increasing profitability. Tied to the efficiency study is the productivity study of Alhassan and Asare (2016) which found that intellectual capital drives productivity and human capital efficiency is the major contributor. While Alhassan and Asare (2016) placed the structural capital as the second most important component, Onumah and Duho (2019) which used a longer span data set covering more banks concluded that capital employed efficiency is rather the second most important and structural capital efficiency the least important in the Ghanaian banking industry.

The literature on the impact of intellectual capital on risk has also been examined. Using data on the Indian banking industry covering the period 1998–2012, Ghosh and Maji (2014) examined the nexus. They employed two measure of risk, namely, credit risk and insolvency risk. The study found that intellectual capital has an inverse effect on credit risk while there is a positive but insignificant effect on financial stability measured using the *z*-score. Also, it is seen that human capital positively but insignificantly affects financial stability. However, structural capital efficiency has a positive and significant effect on financial stability. Onumah and Duho (2019) found that intellectual capital and human capital efficiency positively and significantly affect financial stability. Yet, structural capital efficiency and capital employed efficiency affect financial stability negatively and insignificantly. As regards studies on the determinants of intellectual capital, El-Bannany (2008) employed data on the UK banking industry from 1999 to 2005 and found that among other variables, risk, profitability, barriers to entry, efficiency and the efficiency in the investment in intellectual capital are relevant factors that determine intellectual capital performance. Duho and Onumah (2018) employed a data set of 29 banks covering 2000 to 2014 in Ghana and found that research and development intensity, efficiency of investment in intellectual capital, leverage, operational risk, insolvency risk, profitability and diversification are relevant factors that determine intellectual capital performance of banks.

Few related studies on the subject of diversification and intellectual capital are Hashim *et al.* (2012) and Massaro *et al.* (2015). Hashim *et al.* (2012) explored how diversification influences the nexus between intellectual capital disclosure and firm value using a data set of 233 firms listed on the Main Board of Bursa Malaysia on 31 December 2007. The result indicated that diversification has a positive significant impact on the nexus with stronger link evidenced in highly diversified firms. Massaro *et al.* (2015) examined two key purposes. First, the study examined how intellectual capital development is influenced by strategic intent. Second, it explored how intellectual capital impacts product and service diversification. Employing a lagged analysis with a structured questionnaire with 1,392 responses in the small- and medium-sized accounting practices context, the study found that all three intellectual capital measures (i.e. human capital, structural capital and relational capital) strongly affect product and service diversification. Also, both strategic intent and intellectual capital are evidenced to be influencing each other. Hashim *et al.* (2012) explored intellectual capital disclosure which is distinct from

intellectual capital performance of the banks. Also, Massaro *et al.* (2015) employed the structural equation modelling in small- and medium-sized accounting practices. These studies provide a premise for a further investigation into how intellectual capital and its components affect diversification strategy. Although the studies attempted to draw the nexus between the two variables, they did not either use a quantitative measure for intellectual capital (like the VAICTM model), or the income or asset diversification indices. Moreover, some of these studies were not done in the banking industry and considering the services nature of banking business which is accompanied with higher focus on intellectual capitals (knowledge-based assets) a study is warranted.

In spite of the increase in studies in this area, current studies failed to explore the implications of intellectual capital on diversification strategy of banks. This study seeks to fill the dearth in literature by examining this nexus in the context of an emerging (frontier) economy.

Data and methodology

Data

The study employs an unbalanced data set of 32 banks covering the period 2000–2015. The data have been sourced from the Banking Supervision Department of the Bank of Ghana. The data from the income statement and statement of financial position of the banks have been used and cross-checked with inputs in the annual reports.

Econometric model

The current study adapts the regression models of earlier studies such as Onumah and Duho (in press), Onumah and Duho (2019) and Alhassan and Asare (2016) to provide the regression models that follow:

$$DIV_{i,t} = \alpha + \beta_1 VAIC_{i,t} + \sum_{j=1}^5 \varphi_j CONTROLS_{i,t} + \varepsilon_{i,t}, \quad (1)$$

$$DIV_{i,t} = \alpha + \delta_1 HCE_{i,t} + \delta_2 SCE_{i,t} + \delta_3 CEE_{i,t} + \sum_{k=1}^5 \lambda_k CONTROLS_{i,t} + v_{i,t}. \quad (2)$$

In Equations (1) and (2), DIV is diversification which can either be asset diversity or income diversification; VAICTM is value added intellectual coefficient; HCE is human capital efficiency; SCE is structural capital efficiency, CEE is capital employed efficiency. CONTROLS is a vector of five variables which include bank size, competition, leverage, stock exchange listing and public–private ownership. The variables differ with regards to each bank *i* and each year *t*. In addition, α is the constant variable; β and δ are the regression coefficients of the independent variables; φ and λ are regression coefficients of the control variables while ε and u are the error terms.

Dependent variable

The current study employs two different diversification measures employed in literature. One of the measures rates the extent of income diversification while the other rates the extent of asset diversity. The respective equations are modelled after the work of Laeven and Levine (2007). The two measures are presented in the mathematical format as given below:

$$\text{Asset diversity} = 1 - \left| \frac{\text{Net loans} - \text{other earning assets}}{\text{Total earning assets}} \right|, \quad (3)$$

$$\text{Income diversification} = 1 - \frac{|\text{NII} - \text{other operating income}|}{\text{Total operating income}} \quad (4)$$

NII is the net interest income of the bank. The scores computed are bounded from 0 to 1 and so can be easily explained using percentages. Higher value of the metrics signifies higher diversification while lower value signifies a more focussed strategy. The income diversification measure focuses on the income statement while the asset diversity measure focuses on statement of financial position. The application of the two measures is therefore in accordance with IAS 1: presentation of financial statements.

Independent variables

The current study dwelled on the model of Pulic (1998, 2000, 2001, 2004, 2008) to compute intellectual capital and its components. In this case, the value added intellectual coefficient is used to measure intellectual capital. This score measures how efficient the bank is in deriving value from its stakeholders. It is a measure of the knowledge-base of the banks and is able to drive value, competitive advantage and transient advantage. This value relevance of intellectual capital suggests that it is relevant in determining the choice of a diversification strategy. The human capital efficiency, structural capital efficiency and capital employed efficiency are the components of value added intellectual coefficient. Human capital is the capabilities, abilities, expertise and the knowledge base of the employees of the bank. Structural capital is the processes, procedures, policy, organisational culture, systems and controls and technological infrastructure at the disposal of employees. Capital employed efficiency is the measure of the value created for shareholders of the banks. The arguments here are that when these factors are prevalent, banks will be able to diversify. Another point of argument is that such knowledge-rich banks will focus on the core banking activities to derive optimal value. A corporate strategy is not a choice cast in stone; there is some flexibility as to what goal a bank aims to achieve. For that cause, we argue that these variables can either have a positive or a negative impact on diversification strategy.

A total of five control variables in line with extant literature have been employed. These variables are bank size, competition and leverage (Alhassan and Asare, 2016; Onumah and Duho, 2019). In addition, two static variables have been included to account for difference in strategic choice based on stock exchange listing and based on government ownership (Table I).

Definition	Notation	Measure
Asset diversity	ADIV	Equation (3)
Income diversification	IDIV	Equation (4)
Value added intellectual coefficient	VAIC™	HCE + SCE + CEE
Human capital efficiency	HCE	VA/HC
Structural capital efficiency	SCE	SC/VA
Capital employed efficiency	CEE	VA/CE
Leverage	LEV	Total liabilities/Total assets
Size	SIZE	Natural logarithm of total assets
Competition	COMP	1 less sum of squares of each bank's loan market share
Stock exchange listing	LISTING	Binary of 1 when listed and 0 if otherwise
Government ownership	GOV	Binary of 1 when public-owned and 0 if otherwise

Notes: VA, gross revenue less operating costs including interest expenses, finance and administration expenses excluding personnel expenses; HC is personnel expenses treated in this case as an investment; SC is VA less HC and CE is the book value of total net assets

Source: Authors

Table I.
Description of variables

Results

Descriptive statistics

The results of the descriptive statistics presented in Table II suggest that the overall asset diversity is 63.1 per cent (SD = 24.2 per cent) while that of income diversification is at 71.7 per cent (SD = 19.9 per cent). The results are higher than the respective 58 and 54 per cent reported by Laeven and Levine (2007). The VAICTM recorded an average of 4.31 with a minimum of -2.83 and a maximum of 33.26 which is higher than what was reported by Alhassan and Asare (2016). The higher standard deviation of 3.13 suggests that the scores vary significantly across banks and years. HCE recorded an average of 3.02 followed by CEE which is averaged at 0.68. SCE is the least important, with an average of 0.59 similar to the result of Duho and Onumah (2018) and Onumah and Duho (2019). The bank size recorded an average of 19.53 while competition recorded an average of 0.91. Leverage recorded an average of 82.8 per cent explaining the percentage of total assets financed from liabilities. The result indicates that 25 per cent of the banks in the data set employed are listed on the Ghana Stock Exchange. Also, government-owned banks form 13.5 per cent of the total data set.

Multicollinearity test

The results of the pairwise correlation are presented in Table III. This is relevant to verify that the data set does not suffer from the curse of multicollinearity. Using the rule of thumb of 0.7 proposed by Kennedy (2008), the data does not suffer from multicollinearity. This observation is excluding the correlation coefficient of VAICTM and HCE since both will not enter the same regression model. A further check has been done on the variance inflation factor to verify if they are highly inflated. The results show that for Equation (3), the maximum is 2.60 with an average of 1.55. Also, for Equation (4), the maximum is 2.90 with an average of 1.60. These values are lower than the rule of thumb of 10 proposed by Wooldridge (2016). Thus, the independent variables do not suffer from the curse of multicollinearity and so we proceed to include all of them in the same model.

Asset diversity and intellectual capital

The regression model recorded a strong model fit considering the p -value of the Wald χ^2 . The result in Model 1 finds evidence to suggest that VAICTM increases asset diversity at

Variable	Obs.	Mean	SD	Min.	Max.
ADIV	356	0.631	0.242	0.001	1.000
IDIV	356	0.717	0.199	0.040	1.000
VAIC TM	354	4.311	3.133	-2.827	33.263
HCE	356	3.022	2.959	-1.628	32.075
SCE	354	0.588	0.380	-3.119	2.435
CEE	356	0.681	0.471	-0.538	4.537
SIZE	356	19.534	1.586	13.692	22.608
COMP	356	0.910	0.035	0.817	0.944
LEV	356	0.828	0.174	0.090	1.938
LISTING	356	0.250	0.434	0.000	1.000
GOV	356	0.135	0.342	0.000	1.000

Notes: ADIV is an asset diversity measure; IDIV is an income diversification measure; VAICTM, value added intellectual coefficient; HCE, human capital efficiency; SCE, structural capital efficiency; CEE, capital employed efficiency; SIZE, bank size; COMP, bank competition; LEV, Leverage; LISTING, stock exchange listing; GOV, government ownership

Source: Authors' computation in STATA14

Table II.
Descriptive statistics

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) VAIC TM	1.000								
(2) HCE	0.981***	1.000							
(3) SCE	0.341***	0.225***	1.000						
(4) CEE	0.214***	0.070	0.046	1.000					
(5) SIZE	0.041	0.034	-0.019	0.102*	1.000				
(6) COMP	-0.039	0.017	-0.128**	-0.266***	0.689***	1.000			
(7) LEV	-0.138***	-0.178***	-0.084	0.303***	0.065	-0.063	1.000		
(8) LISTING	0.030	0.001	0.070	0.161***	0.320***	0.057	0.086	1.000	
(9) GOV	-0.053	-0.066	-0.058	0.126**	0.191***	-0.066	-0.032	0.076	1.000

Notes: ADIV is an asset diversity measure; IDIV is an income diversification measure; VAICTM, value added intellectual coefficient; HCE, human capital efficiency; SCE, structural capital efficiency; CEE, capital employed efficiency; SIZE, bank size; COMP, bank competition; LEV, leverage; LISTING, stock exchange listing; GOV, government ownership. ***, **, * Significant at 10, 5 and 1 per cent levels, respectively

Table III.
Pairwise correlations

Source: Authors' computation in STATA14

1 per cent level of significance. This means that banks with high intellectual capital performance tend to be highly diversified on their statement of financial position. This phenomenon also suggests that intellectually-rich banks seek to use long-term diversification strategies that involve investments beyond one year period. Another explanation is that intellectually-rich banks explore avenues in terms of investment in other assets instead of focusing only on loan offerings. Model 2 reports the contributing factors driving the positive effect of intellectual capital on asset diversity. Human capital efficiency has a positive significant effect on asset diversity at 1 per cent level of significance. This suggests that the human capital efficiency is the main driver of asset diversity. This supports the importance of intellectual capital found in earlier studies such as Bontis (1998), Mention and Bontis (2013), Alhassan and Asare (2016) and Onumah and Duho (in press). In effect, banks with efficient human capital have the requisite technical skills, business acumen, digital skills and the capability to explore avenues for investment. Also, structural capital efficiency has a positive effect on asset diversity at 5 per cent level of significance which is similar to the result of Massaro *et al.* (2015) that found structural capital as a significant diversification determinant. This explains the value relevance of strong internal controls, policies, organisational culture, processes and procedures and the technology-base of banks in exploring various investment avenues that can form part of the value stream of banks. The study found no significant positive effect of capital employed efficiency on asset diversity.

Bank asset does not have a significant effect on asset diversity, suggesting that bank size does not really matter in bank's choice of asset diversity strategy. Competition in the industry has a negative effect on asset diversity, suggesting that competition hampers banks from diversifying their asset base. Leverage, stock exchange listing and government ownership have also been found to have an insignificant effect on asset diversity (Table IV).

Income diversification and intellectual capital

The results of VAICTM on income diversification are reported in Model 3. The results show that VAICTM has a negative effect on income diversification at 1 per cent level of significance. This suggests that intellectually-rich banks tend to shy away from diversifying their revenue. This could be for the obvious reason of ensuring that performance, efficiency and stability are kept at positive levels. This result is essential as some earlier studies in the Ghanaian context found evidence to suggest that income diversification reduces efficiency (Alhassan, 2015), profitability and financial stability of banks (Duho *et al.*, 2019). Model 4 reports the components of VAICTM that drive the decision to avoid the diversification strategy for a

	(1) ADIV	(2) ADIV	(3) IDIV	(4) IDIV
VAIC TM	0.014*** (0.003)		-0.020*** (0.002)	
HCE		0.010*** (0.004)		-0.020*** (0.002)
SCE		0.075** (0.037)		-0.022 (0.028)
CEE		0.037 (0.027)		-0.015 (0.024)
SIZE	0.004 (0.012)	-0.002 (0.013)	0.035*** (0.009)	0.034*** (0.010)
COMP	-1.998*** (0.505)	-1.660*** (0.557)	-1.733*** (0.371)	-1.704*** (0.421)
LEV	0.100 (0.070)	0.091 (0.073)	0.168*** (0.049)	0.164*** (0.051)
LISTING	-0.021 (0.030)	-0.024 (0.030)	-0.121*** (0.025)	-0.121*** (0.025)
GOV	0.030 (0.032)	0.035 (0.032)	-0.056** (0.028)	-0.056** (0.028)
_cons	2.237*** (0.338)	1.998*** (0.366)	1.602*** (0.249)	1.587*** (0.278)
Banks	32	32	32	32
Obs.	354	354	354	354
Parameters	6	8	6	8
R ²	0.119	0.129	0.208	0.208
Wald χ^2	52.39***	54.43***	152.55***	164.74***
AR (1)	14.35***	14.84***	2.58	2.33
B-P/C-W χ^2	4.45**	5.09**	0.59	0.65

Notes: ADIV is an asset diversity measure; IDIV is an income diversification measure; VAICTM, value added intellectual coefficient; HCE, human capital efficiency; SCE, structural capital efficiency; CEE, capital employed efficiency; SIZE, bank size; COMP, bank competition; LEV, leverage; LISTING, stock exchange listing; GOV, government ownership. B-P/C-W is Breusch-Pagan/Cook-Weisberg test for heteroscedasticity (Breusch and Pagan, 1979; Cook and Weisberg, 1983) and AR(1) is first order serial correlation test (Wooldridge, 2002). Standard errors are in parenthesis and are robust to heteroscedasticity. *, **, *** Significant at 10, 5 and 1 per cent levels, respectively

Source: Authors' computation in STATA14

Table IV.
Regression results

focussed strategy. The results suggest that human capital efficiency negatively affects income diversification at 1 per cent level of significance. This suggests that bank managers and other employees are those that decide on focusing rather than diversifying their income base. These results are very essential as some analysts argued that the collapse of some banks in 2017–2018 in Ghana was driven by their over-diversification which exposed them to high risk and declined profit. In addition, the focus on the human capital theory is of relevance in explaining the type of diversification strategy as after the collapse of the banks (Alhassan and Asare, 2016; Onumah and Duho, in press), there have been reports of some of the employees of the banks not being qualified; some without a tertiary education certificate. A case in point is UT Bank, one of the collapsed banks, which was found to have a number of its employees unqualified for the positions they hold, some months after the bank collapsed. Structural capital and capital employed efficiency also decrease income diversification but at an insignificant level. In general, these findings contradict the results of the asset diversity and intellectual capital nexus as well as the results of Massaro *et al.* (2015) which found positive link between intellectual capital and diversification.

The results also indicated that all the control variables have a significant effect on income diversification at 1 per cent level of significance except for government ownership which is at 5 per cent. The result suggests that bank size and leverage positively enhance the choice for an income diversification strategy. As regards size, the result is consistent with the results of Meng *et al.* (2018) and can be explained by economies of scope. High costs of operation can incentivise the need to enter into new business areas so as to diversify income sources. DeYoung and Rice (2004) also posited that larger banks will pursue a diversification strategy different from smaller banks. Competition on the other hand rather stifles the decision to diversify income. This result ties in with the economies of scope effect

evidenced. Market concentration (not competition) is driving income diversification. As regards stock exchange listing, listed banks tend to focus on diversifying their income sources as compared to non-listed banks. Government-owned banks also tend not to diversify their revenue model but rather employ a focussed strategy as compared to the private banks.

Conclusions

Globally, the business of banking is metamorphosing from the traditional intermediation business due to competition, liberalisation, technological development, globalisation and customer centrism. Banks are exploring new ways to provide a comprehensive service to their customers with speed, agility, integrity and at a lower cost. The fourth industrial revolution has demystified the potentials of information and knowledge in providing services. The question as to what diversification strategy to employ or how the revenue model of a bank needs to be are essential issues discussed by analysts, bankers and decision-supports staffs such as management accountants. The current study filled the dearth in literature by exploring the nexus between intellectual capital performance of banks and their diversification strategy using a data set of 32 banks from 2000 to 2015 in Ghana. The choice of the Ghanaian context is very relevant as policy makers, analysts and consultants are still discussing the negative impact of ineffective diversification strategy, corporate governance, intellectual capital management and risk management on the collapse of some banks in 2017–2018. More so, there is the emergence of bancassurance services in banks, although not currently a major part of the revenue stream, an understanding of diversification strategy tied to knowledge management will be of importance for policy, practice and set a tone for other studies.

The results show that intellectual capital drives the choice for an asset diversification strategy in banks. This is driven by human capital and structural capital base of the banks. The human capital base is the knowledge-base, professional qualification, investment and digital acumen of management, decision support employees and other employees of the banks. The structural capital base is the internal control systems, processes and procedures, organisational culture, policy and technological infrastructure of the banks. Income diversification on the other hand is negatively influenced by intellectual capital, suggesting that intellectually-rich banks prefer a focus strategy than diversification in terms of their revenue model. The human capital base is the main factor motivating the choice for focussed strategy for the revenue model. The finding supports the results of Massaro *et al.* (2015) which also found a significant impact of intellectual capital on portfolio diversification. However, the results differ regarding the components of intellectual capital and the directions. The direction of relationship is determined by whether banks are diversifying with regard to income statement or with regard to statement of financial position (balance sheet). In terms of asset diversity, the results of human capital and structural capital are significant while with the income diversification, only human capital has significant impact. This disparity can be explained by the differences in industry and contexts examined in the studies.

The results also show that competition in the industry motivates the choice of a focussed strategy above the diversified strategy. In addition, bank size and leverage enhances the choice for a diversified strategy as opposed to a focussed strategy. Banks listed on the stock exchange prefer a focussed strategy to those that are unlisted. Also, government-owned banks prefer a focussed strategy to a diversified strategy for their revenue model.

Implications for policy, practice and academia

The study has implications for policy making, practice and for future research. For policy, the bank of Ghana in spite of granting the Universal Banking licence needs to critically

monitor the trends for diversification and risk in the periodic prudential reports submitted for supervisory purposes. The Bank of Ghana in 2016 gave directive for the reportage of value added statements in the financial reports of banks. This should not just be left there; value added metrics have a stakeholder perspective than just the shareholder view of income so banks should also report value added metrics. These metrics should be monitored as they have predictive value. There needs to be some regulation regarding the personnel of banks. This is relevant to bring sanity in the industry. This can be done by the Institute of Chartered Accountants (Ghana), and the Institute of Bankers (Ghana) to step up their game regarding regulations and continuous professional development among others. The Securities and Exchange Commission of Ghana also needs to employ value added reporting in their financial statement and make use of the metrics. The importance of knowledge management cannot be over-emphasised, and the need to enhance digital skills should be regarded as essential from the national policy level.

Practice wise, the results are relevant for the boards of directors of banks. They are charged with the governance of banks and are engaged in the formulation of strategies. The choice of diversification strategy is dependent on the knowledge-base of banks before the required benefits can be derived. In addition, there should be the need to have a masterminded agenda on knowledge management in banks. This is relevant since there is ample evidence to suggest that intellectual capital drives value and competitive advantage. For decisions support units of banks such as treasury managers, financial and investment analysts, management accountants and chief finance officers, there is the need to view intellectual capital as a key strategic asset and thus should be accounted for appropriately. Prediction models should inculcate intellectual capital efficiency metrics to ensure that the aspect of value derived from intangibles is accounted for. This will eventually enhance the precision of estimates and inferences.

On the menu of future researchers should be the need to explore the qualitative aspects of the issues around diversification and intellectual capital. An interview, round table discussion or an archival research can be conducted to find out the how and the why of the issues. In addition, other studies can explore the nexus in different jurisdictions and with larger data sets so as to have a generalised understanding of the nexus. The study can be extended to cover Sub-Saharan Africa and other continents. Apart from the banking industry, other industries, sectors, economic blocs among others should be of interest for future researchers. The stock markets can be examined to be able to understand the industry-based differences that come to play in considering the nexus between intellectual capital and diversification strategy. The knowledge of decision support units on intellectual capital can be examined. The results of this study provide relevant insights for teaching in the areas of strategic management, accounting, banking and finance, economics, among others.

References

- Abuzayed, B., Al-Fayoumi, N. and Molyneux, P. (2018), "Diversification and bank stability in the GCC", *Journal of International Financial Markets, Institutions and Money*, Vol. 57, pp. 17-43.
- Alhassan, A.L. (2015), "Income diversification and bank efficiency in an emerging market", *Managerial Finance*, Vol. 41 No. 12, pp. 1318-1335.
- Alhassan, A.L. and Asare, N. (2016), "Intellectual capital and bank productivity in emerging markets: evidence from Ghana", *Management Decision*, Vol. 54 No. 3, pp. 589-609.
- Beck, N. and Katz, J.N. (1995), "What to do (and not to do) with time-series cross-section data", *American Political Science Review*, Vol. 89 No. 3, pp. 634-647.
- Bontis, N. (1998), "Intellectual capital: an exploratory study that develops measures and models", *Management Decision*, Vol. 36 No. 2, pp. 63-76.

- Breusch, T.S. and Pagan, A.R. (1979), "A simple test for heteroscedasticity and random coefficient variation", *Econometrica: Journal of the Econometric Society*, Vol. 47 No. 5, pp. 1287-1294.
- Cook, R.D. and Weisberg, S. (1983), "Diagnostics for heteroscedasticity in regression", *Biometrika*, Vol. 70 No. 1, pp. 1-10.
- Corrado, C.A. and Hulten, C.R. (2010), "How do you measure a 'technological revolution'?", *American Economic Review*, Vol. 100 No. 2, pp. 99-104.
- DeYoung, R. and Rice, T. (2004), "Noninterest income and financial performance at US commercial banks", *Financial Review*, Vol. 39 No. 1, pp. 101-127.
- DeYoung, R. and Torna, G. (2013), "Nontraditional banking activities and bank failures during the financial crisis", *Journal of Financial Intermediation*, Vol. 22 No. 3, pp. 397-421.
- Duho, K.C.T. and Onumah, J.M. (2018), "The determinants of intellectual capital performance of banks in Ghana: an empirical approach", paper presented at the 4th International Research Conference of the College of Humanities, University of Ghana, Accra, 1-2 November, available at: <https://osf.io/d8cwz/> (accessed 20 March 2019).
- Duho, K.C.T., Onumah, J.M. and Owodo, R.A. (2019), "Does diversification, competition and ownership impact the profitability, profit efficiency and financial stability of banks in frontier markets?", *5th School of Social Sciences International Conference, University of Ghana Printing Press, Accra*, p. 38.
- El-Bannany, M. (2008), "A study of determinants of intellectual capital performance in banks: the UK case", *Journal of Intellectual Capital*, Vol. 9 No. 3, pp. 487-498.
- Ghosh, S.K. and Maji, S.G. (2014), "The impact of intellectual capital on bank risk: evidence from Indian banking sector", *IUP Journal of Financial Risk Management*, Vol. 11 No. 3, pp. 18-38.
- Hashim, F., Jaffar, R., Hassan, M.S. and Shukor, Z.A. (2012), "The role of diversification on the relationship between intellectual capital disclosure and firm value", *Jurnal Pengurusan*, Vol. 35, pp. 43-55.
- Isshaq, Z. and Bokpin, G.A. (2012), "Expansion and efficiency in banking: evidence from Ghana", *Managerial and Decision Economics*, Vol. 33 No. 1, pp. 19-28.
- Kennedy, P. (2008), *A Guide to Econometrics*, 6th ed., Blackwell Publishing, Oxford.
- Korsah, K.B., Nyarko, E.K. and Tagoe, N.A. (2001), "Impact of financial sector liberalisation on competition and efficiency in the Ghanaian banking industry", IFLIP Research Paper, International Labour Organization No. 01-2, pp. 1-50.
- Laeven, L. and Levine, R. (2007), "Is there a diversification discount in financial conglomerates?", *Journal of Financial Economics*, Vol. 85 No. 2, pp. 331-367.
- McGrath, R.G. (2013), "Transient advantage", *Harvard Business Review*, Vol. 91 No. 6, pp. 62-70.
- Massaro, M., Dumay, J. and Bagnoli, C. (2015), "Where there is a will there is a way: IC, strategic intent, diversification and firm performance", *Journal of Intellectual Capital*, Vol. 16 No. 3 pp. 490-517.
- Meng, X., Cavoli, T. and Deng, X. (2018), "Determinants of income diversification: evidence from Chinese banks", *Applied Economics*, Vol. 50 No. 17, pp. 1934-1951.
- Mensah, J.M.K. and Obeng, I.K. (2015), "Universal banking and Basel III in Ghana", *Australian Journal of Commerce Study*, available at: <https://ssrn.com/abstract=2573329> (accessed 26 January 2019).
- Mention, A.-L. and Bontis, N. (2013), "Intellectual capital and performance within the banking sector of Luxembourg and Belgium", *Journal of Intellectual Capital*, Vol. 14 No. 2, pp. 286-309.
- Mondal, A. and Ghosh, S.K. (2012), "Intellectual capital and financial performance of Indian banks", *Journal of Intellectual Capital*, Vol. 13 No. 4, pp. 515-530.
- Onumah, J.M. and Duho, K.C.T. (2019), "Intellectual capital: its impact on financial performance and financial stability of Ghanaian banks", *Athens Journal of Business and Economics*, Vol. 5 No. 3, pp. 243-268.
- Onumah, J.M. and Duho, K.C.T. (in press), "Impact of intellectual capital on bank efficiency in emerging markets: evidence from Ghana", *International Journal of Banking, Accounting and Finance*.
- Porter, M.E. (1990), "New global strategies for competitive advantage", *Planning Review*, Vol. 18 No. 3, pp. 4-14.

-
- Porter, M.E. (2008), *Competitive Advantage: Creating and Sustaining Superior Performance*, Simon and Schuster, New York, NY.
- Pulic, A. (1998), "Measuring the performance of intellectual potential in knowledge economy", paper presented at the 2nd McMaster Word Congress on Measuring and Managing Intellectual Capital by the Austrian Team for Intellectual Potential.
- Pulic, A. (2000), "VAIC™ – an accounting tool for IC management", *International Journal of Technology Management*, Vol. 20 Nos 5-8, pp. 702-714.
- Pulic, A. (2001), "Value creation efficiency analysis of Croatian banks, 1996–2000", available at: www.vaic-on.net/start.htm (accessed 26 January 2014).
- Pulic, A. (2004), "Intellectual capital—does it create or destroy value?", *Measuring Business Excellence*, Vol. 8 No. 1, pp. 62-68.
- Pulic, A. (2008), "The principles of intellectual capital efficiency—a brief description", Inspired by Knowledge in Organisations: Essays in Honor of Professor Karl-Erik Sveiby on his 60th Birthday 29 June.
- Saengchan, S. (2008), "The role of intellectual capital in creating value in the banking industry", *International Review of Business Research*, Vol. 7 No. 2, pp. 157-169.
- Sheng, A. and Tannor, A.A. (1996), "Ghana's financial restructuring, 1983–91", in Sheng, A. (Ed.), *Bank Restructuring: Lessons from the 1980s*, The World Bank, Washington, DC, pp. 123-132.
- Sullivan, P.H. Jr and Sullivan, P.H. Sr (2000), "Valuing intangibles companies – an intellectual capital approach", *Journal of Intellectual Capital*, Vol. 1 No. 4, pp. 328-340.
- Wooldridge, J.M. (2002), *Econometric Analysis of Cross Section and Panel Data*, MIT Press, Cambridge, MA.
- Wooldridge, J.M. (2016), *Introductory Econometrics: A Modern Approach*, 6th ed., Cengage, Boston, MA.
- Yalama, A. and Coskun, M. (2007), "Intellectual capital performance of quoted banks on the Istanbul Stock Exchange Market", *Journal of Intellectual Capital*, Vol. 8 No. 2, pp. 256-271.

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